

## Claims

1. Plane-parallel structures of silicon/silicon oxide, obtainable by heating plane-parallel structures of  $\text{SiO}_y$  in an oxygen-free atmosphere at a temperature above 400 °C, wherein  $0.70 \leq y \leq 1.8$ , or plane-parallel structures of silicon/silicon oxide, obtainable by heating plane-parallel structures of  $\text{SiO}_x$  in an oxygen-free atmosphere at a temperature above 400 °C, wherein  $0.03 \leq x \leq 0.95$ , especially  $0.05 \leq x \leq 0.50$ , very especially  $0.10 \leq x \leq 0.30$ .
2. A plane-parallel pigment, comprising a silicon/silicon oxide layer, obtainable by heating a  $\text{SiO}_y$  layer in an oxygen-free atmosphere at a temperature above 400 °C, wherein  $0.70 \leq y \leq 1.8$ , or a plane-parallel pigment, comprising a silicon/silicon oxide layer, obtainable by heating plane-parallel structures of  $\text{SiO}_x$ , wherein  $0.03 \leq x \leq 0.95$ , especially  $0.05 \leq x \leq 0.50$ , very especially  $0.10 \leq x \leq 0.30$ .
3. A pigment according to claim 2, wherein the silicon/silicon oxide layer; obtainable by heating a  $\text{SiO}_y$  layer in an oxygen-free atmosphere at a temperature above 400 °C, forms the core of the pigment; wherein  $0.70 \leq y \leq 1.8$ .
4. A pigment according to claim 3, comprising a further layer of a dielectric material having a "high" refractive index.
5. A pigment according to claim 4, wherein the dielectric material is selected from silicon carbide (SiC), zinc sulfide (ZnS), zinc oxide (ZnO), zirconium oxide ( $\text{ZrO}_2$ ), titanium dioxide ( $\text{TiO}_2$ ), carbon, indium oxide ( $\text{In}_2\text{O}_3$ ), indium tin oxide (ITO), tantalum pentoxide ( $\text{Ta}_2\text{O}_5$ ), cerium oxide ( $\text{CeO}_2$ ), yttrium oxide ( $\text{Y}_2\text{O}_3$ ), europium oxide ( $\text{Eu}_2\text{O}_3$ ), iron oxides such as iron(II)/iron(III) oxide ( $\text{Fe}_3\text{O}_4$ ) and iron(III) oxide ( $\text{Fe}_2\text{O}_3$ ), hafnium nitride (HfN), hafnium carbide (HfC), hafnium oxide ( $\text{HfO}_2$ ), lanthanum oxide ( $\text{La}_2\text{O}_3$ ), magnesium oxide (MgO), neodymium oxide ( $\text{Nd}_2\text{O}_3$ ), praseodymium oxide ( $\text{Pr}_6\text{O}_{11}$ ), samarium oxide ( $\text{Sm}_2\text{O}_3$ ), antimony trioxide ( $\text{Sb}_2\text{O}_3$ ), silicon monoxides (SiO), selenium trioxide ( $\text{Se}_2\text{O}_3$ ), tin oxide ( $\text{SnO}_2$ ), tungsten trioxide ( $\text{WO}_3$ ) and combinations thereof, especially  $\text{TiO}_2$ ,  $\text{ZrO}_2$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Fe}_3\text{O}_4$ ,  $\text{Cr}_2\text{O}_3$ , ZnO, or a mixture of those oxides, or an iron titanate, an iron oxide hydrate, a titanium suboxide or a mixture or mixed phase of those compounds.
6. A pigment according to claim 2 comprising in this order:

- (a) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_y$  layer in an oxygen-free atmosphere at a temperature above 400 °C,  
(b) a reflective layer, especially a metal layer, and  
(c) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_y$  layer in an oxygen-free atmosphere at a temperature above 400 °C, wherein  $0.70 \leq y \leq 1.8$ .

7. A pigment according to claim 2, wherein the pigment comprises in this order:

(a2) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.70-0.99}$  layer in an oxygen-free atmosphere at a temperature above 400 °C,

(b2) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{1.00-1.80}$  layer in an oxygen-free atmosphere at a temperature above 400 °C, and

(c2) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.70-0.99}$  layer in an oxygen-free atmosphere at a temperature above 400 °C, or

the pigment comprises in this order:

(a3) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{1.00-1.80}$  layer in an oxygen-free atmosphere at a temperature above 400 °C,

(b3) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.70-0.99}$  layer in an oxygen-free atmosphere at a temperature above 400 °C, and

(c3) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{1.00-1.80}$  layer in an oxygen-free atmosphere at a temperature above 400 °C.

8. A pigment according to claim 2, wherein the pigment comprises in this order:

(a4) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.03-0.69}$  layer in an oxygen-free atmosphere at a temperature above 400 °C,

(b4) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{1.00-1.8}$  layer in an oxygen-free atmosphere at a temperature above 400 °C, and

(c4) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.03-0.69}$  layer in an oxygen-free atmosphere at a temperature above 400 °C and optionally further layers, or

the pigment comprises in this order:

(a5) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.03-0.69}$  layer in an oxygen-free atmosphere at a temperature above 400 °C,

(b5) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.70-0.99}$  layer in an oxygen-free atmosphere at a temperature above 400 °C, and

(c5) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.03-0.69}$  layer in an oxygen-free atmosphere at a temperature above 400 °C and optionally further layers, or

the pigment comprises in this order:

- (a6) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.70-0.99}$  layer in an oxygen-free atmosphere at a temperature above 400 °C,
- (b6) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.03-0.69}$  layer in an oxygen-free atmosphere at a temperature above 400 °C, and
- 5 (c6) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.70-0.99}$  layer in an oxygen-free atmosphere at a temperature above 400 °C and optionally further layers, or the pigment comprises in this order:
- (a7) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{1.00-1.80}$  layer in an oxygen-free atmosphere at a temperature above 400 °C,
- 10 (b7) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{0.03-0.69}$  layer in an oxygen-free atmosphere at a temperature above 400 °C, and
- (c7) a silicon/silicon oxide layer obtainable by heating a  $\text{SiO}_{1.00-1.80}$  layer in an oxygen-free atmosphere at a temperature above 400 °C and optionally further layers.
- 15 9. A composition comprising a high molecular weight organic material and from 0.01 to 80 % by weight, preferably from 0.1 to 30 % by weight, based on the high molecular weight organic material, of a pigment according to any one of claims 2 to 8.
- 20 10. A cosmetic preparation or formulation comprising from 0.0001 to 90 % by weight of the plane-parallel structures of silicon/silicon oxide according to claims 1 or the pigment according to any one of claims 2 to 8 and from 10 to 99.9999 % of a cosmetically suitable carrier material, based on the total weight of the cosmetic preparation or formulation.
- 25 11. Use of a pigment according to any one of claims 2 to 8, in ink-jet printing, for dyeing textiles, for pigmenting surface coatings, printing inks, plastics, cosmetics, glazes for ceramics and glass.
- 30 12. A method of producing plane-parallel structures of silicon/silicon oxide, comprising the steps:
- a) vapour-deposition of a separating agent onto a movable carrier to produce a separating agent layer,
- b) vapour-deposition of an  $\text{SiO}_y$  layer onto the separating agent layer,
- c) dissolution of the separating agent layer in a solvent,
- 35 d) separation of the  $\text{SiO}_y$  from the solvent, wherein  $0.70 \leq y \leq 1.8$ , and
- e) heating the  $\text{SiO}_y$  in an oxygen-free atmosphere to a temperature above 400°C.